ABRAMS TANK (M1A2)

The mission of the M1A2 SEP Abrams tank is to close with and destroy enemy forces using firepower, maneuver, and shock effect. The M1A2 SEP is being fielded to armor battalions and cavalry squadrons of the heavy force. SEP upgrades are intended to improve lethality, survivability, mobility, sustainability, and provide increased situational awareness and command & control enhancements. Specific changes include:

- The addition of two 2nd generation Forward Looking Infrared Radar sights (FLIRs).
- An under armor auxiliary power unit to power the tank and sensor suites.
- A thermal management system to provide crew and electronics cooling.
- Increased memory and processor speeds and full color map capability.
- Force XXI Battle Command, Brigade and Below (FBCB2) Integrated Combat Command and Control (IC^3) to share battle command information and situational awareness with all components of the combined arms team.

In addition to the aforementioned SEP components, additional weight reduction measures, survivability enhancements, and safety improvements applied to the M1A2 were incorporated into the configuration that underwent LFT&E in FY01.

BACKGROUND INFORMATION

The M1A2 IOT&E was conducted from September-December 1993. Based on the results of the IOT&E, the Director determined that the M1A2 was operationally effective but not operationally suitable, and unsafe. That assessment was based on poor availability and reliability of the tank and instances of the uncommanded main gun and turret movement and unintended .50 caliber machinegun fire. FOT&E II in June 1996 confirmed the adequacy of the applied corrective actions, and the Director assessed the M1A2 as both operationally effective and suitable.

The M1A2 SEP is a further upgrade to the M1A2 tank. OT conducted to date demonstrated an improved capability of the 2nd generation FLIR over the 1st generation FLIR to detect, recognize, and

identify targets at operationally relevant ranges. During FOT&E III, involving M1A2 SEP tanks and baseline M1A2 tanks, the M1A2 SEP demonstrated a significantly better performance during night engagements over the baseline M1A2 in the number of targets hit. During day engagements, no performance difference was detected between the M1A2 SEP and the baseline M1A2.

The M1A2 SEP, along with the additional engineering changes included since 1993, sometimes referred to as the M1A2 Tank 2000, is an LFT&E covered product improvement requiring an LFT&E program. In July 1999, the Director approved an M1A2 Tank 2000 LFT&E strategy that included both component-level and system-level testing conducted in FY01.

TEST & EVALUATION ACTIVITY

The U.S. Army conducted the M1A2 SEP FOT&E IV in conjunction with the M2A3 Bradley Fighting Vehicle IOT&E at Fort Hood, Texas, during the period September-October 2000. It was structured to compare the operational effectiveness and suitability of the M1A2 SEP against the currently fielded M1A2. The Army conducted the test in accordance with an approved plan and DOT&E monitored the test on site and conducted an independent evaluation.

Phase I LFT&E activities were completed in FY01. Phase I addressed M1A2 SEP specific design features with component-level ballistic shock tests, non-destructive tests, and engineering analyses. Ballistic shock tests of the improved Gunner's Primary Sight with its 2nd generation FLIR were conducted in January and February 2001.

Phase III system-level live fire tests were conducted between October 2000 and July 2001. Phase III comprised three system-level live fire tests, and fourteen full-up, system-level live fire tests. The tested threats included hand-held infantry weapons, mines, artillery, anti-tank guided-missiles, and tank-fired munitions. In addition to performing detailed assessments of system damage following each test, most test events provided opportunities for representative crews and maintenance teams to exercise Battle Damage Assessment and Repair procedures to assess training and techniques. Damage assessment team meetings concluded in August 2001. Initial test reports, evaluations, and assessment briefings were disseminated in December 2001.

TEST & EVALUATION ASSESSMENT

The M1A2 SEP is operationally effective. Overall, the M1A2 SEP showed an improved level of operational effectiveness in comparison to the M1A2. This improvement in operational effectiveness is attributed to the M1A2 SEP's superior capability compared to the M1A2 to detect, identify, and hit targets as well as the M1A2 SEP's improved night fighting capability as demonstrated in FOT&E III and a Detection, Acquisition, Recognition, Identification (DARI) test.

The M1A2 SEP met the specified reliability requirements and did better than the baseline M1A2s. However, there were many failures attributable to the IC^3 and FBCB2. These failures were not severe enough to be considered combat mission failures but did markedly degrade the command and control systems. If these failures had been included in the reliability evaluation, the M1A2 SEP would not have met its reliability requirements. The M1A2 SEP also met its availability and maintainability requirements.

IC^3 was designed to meet a key system requirement for digital battle command and is the M1A2 SEP link to FBCB2. Technical testing conducted on the M1A2 SEP indicated that the system's IC^3 was sufficiently mature to enter FOT&E IV and successfully demonstrate system digital C^2 requirements. However, the system performed poorly in FOT&E IV.

The FOT&E III, FOTE IV and the DARI were adequate to determine the operational effectiveness and suitability of the M1A2 SEP. These events were deemed adequate by DOT&E despite three significant shortfalls: (1) immature FBCB2 hardware and software; (2) the absence of Army Tactical Command and Control Systems did not allow demonstration of Army Battle Command Systems (ABCS) interoperability (for example; automated calls for artillery fire); and (3) the marginal performance of the Mobile Automated Instrumentation System Real Time Casualty Assessment. In spite of these shortfalls, the M1A2 SEP demonstrated an improvement in operational effectiveness over the baseline M1A2 and met its suitability requirements.

FOT&E IV was conducted with only the FBCB2 component of the Army Battle Command System. M1A2 SEP-equipped units are scheduled to participate in future FBCB2 OT events, allowing for the opportunity for the M1A2 SEP to demonstrate full interoperability with the remaining components of ABCS.

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